Investigating the effects of three needling parameters (manipulation, retention time, insertion site) on needling sensation and pain profiles and regional pressure pain threshold: a study of eight deep needling interventions

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A thesis submitted as partial requirement for the degree of

Doctor of Philosophy

Faculty of Science

University of Technology, Sydney

June 2013

Certificate of original authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis

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Acknowledgements

This research study would not have been possible without the academic, scientific and technical help and contribution from many individuals at the University of Technology, Sydney. My sincere appreciation goes to:

My principal supervisor, Dr Deirdre Cobbin, for not only being present during the thirteen months of data collection, but also for her valuable guidance in planning and executing this project. Deirdre also co-authored a publication that involved a section of the actual project. Finally, her intellectual input and her ability to critically edit the writing of the thesis has significantly contributed to the drafting of this thesis and to the development of my writing and reasoning skills.

The 24 subjects who willingly completed all eight treatment sessions and also to the School of Molecular and Medical Biosciences for providing the facilities required to conduct the data collection phase of the project.

My co-supervisor, Dr Chris Zaslawski for administering all the interventions required for the project and for initial introduction to the statistical program Minitab.

Ms Rochelle Seneviratne, from the Faculty of Science Research Office, who supported my efforts and assisted with the administration of my candidature.

The Research Office at the University of Technology which provided The Thesis Completion Equity Grant and the National Institute of Complementary Medicine (NICM), which provided the financial support required to complete the project.

My colleague, Victoria Choi for her patient and diligent assistance in proofreading the evolving thesis drafts.

My family for their unflagging support during the various stages of the project.

Abstract

Background: Since 1999, research studies on the effect of acupuncture on regional pressure pain threshold (PPT) have been carried out at the College of Traditional Chinese Medicine, University of Technology, Sydney. The current study extended the previous research by investigating three needling parameters (needle retention time, needle manipulation and site of needle insertion) on the strength and quality of needling sensation (*deqi*) and on the strength of needling pain.

Aims: To investigate the effect of three needling parameters (needle manipulation, needle retention time and site of needle insertion) on:

(a) the strength and quality of needling sensation reported,

(b) the strength of pain at the needling site and

(c) regional PPT measured at ten regional sites.

Methods: The design used in this study was a dual blind (subject and assessor) within subject experimental design with randomised repeated measures. Twenty-four healthy subjects (12 males and 12 females) completed eight interventions scheduled at least one week apart. In each intervention manual acupuncture to LI4 or to a designated nonacupoint (NAP) was applied on the hand. Real or simulated manipulation was applied every three minutes and the needle was retained for either one or 21 minutes. PPT measurements were completed before, during and following the 21-minute intervention period using an algometer at ten regional sites across the body. Intensities of needling sensation and pain were measured using a 100mm visual analogue scale (VAS) every three minutes and sensation qualities were reported post-intervention. The eight interventions comprised the following parameters:

Intervention	**Site**	**Retention time**	**Manipulation**
LI4m^{+1}	LI4	1 minute	present
LI4m^{-1}	LI4	1 minute	absent(simulated manipulation)
LI4m^{+21}	LI4	21 minutes	present
LI4m^{-21}	LI4	21 minutes	absent (simulated manipulation)
NAPm^{+1}	NAP	1 minute	present
NAPm^{-1}	NAP	1 minute	absent(simulated manipulation)
NAPm^{+21}	NAP	21 minutes	present
NAPm^{-21}	NAP	21 minutes	absent(simulated manipulation)

Results: Independent of the site of measurement (where the mean % PPT of all ten sites were combined for each intervention), the post-intervention mean % PPT were significantly elevated for all eight interventions. LI4m^{+21} produced the highest increase (9.1%) and LI4m^{-21} the lowest (3.7%). In terms of comparisons by site, the post-intervention mean % PPT were significantly elevated at all ten sites for the following interventions LI4m^{+21}, NAPm^{-21} and NAPm^{+1}; at nine sites for NAPm^{+21}, LI4m^{-1} and NAPm^{-1}, at seven sites for LI4m^{+1} and at only one site for LI4m^{-21}. No significant difference was found regarding the subjects' mean anxiety and tension levels and the acupuncturist's behaviour among the interventions. Immediately post-insertion, mean needle sensation and pain scores were similar for all eight interventions. At all other measurement intervals, irrespective of insertion site (LI4 or NAP), only the two interventions with needle manipulation every three minutes and with needle retention for 21 minutes maintained statistically significantly elevated needle sensation and pain scores.

Conclusions: The study did not find any clear relationship between the three needling parameters on regional PPT. However, it has shown that needle insertion is followed by an elevation in PPT above baseline levels that persists after needle removal. Presence or absence of needle manipulation and the duration of needle retention were important variables in terms of the intensity of needle sensation and pain. Similar needle sensation qualities and intensities were elicited at both the acupoint and the nonacupoint. This study also found that, irrespective of needling location, deep needling for 21 minutes with ongoing manipulation elicited and maintained elevated levels of needling pain and needling sensation. The study failed to provide findings that support the common Traditional Chinese Medicine (TCM) assumptions or assertions that *deqi* is necessary or essential for eliciting a physiological effect.

Supporting communications and publications

- Loyeung BYK, Cobbin DM. 2013 Investigating the effects of three needling parameters (manipulation, retention time, insertion site) on needling sensation and pain profiles: a study of eight deep needling interventions. Evidence-Based Complementary and Alternative Medicine. 2013: Article ID 136763, 12 pages, 2013. doi:10.1155/2013/136763.

Poster presentation:

- Loyeung BYK, Cobbin DM, Zaslawski C. 2012 Investigating the effects of the site of needle insertion, needle manipulation and retention time on *deqi* (needle sensation). 2012 Australian Acupuncture & Chinese Medicine Association conference, Brisbane.
- Loyeung BYK, Cobbin DM. 2013 Is needling retention time important? New Horizons conference, 18-20 November 2013, Royal North Shore Hospital, Sydney.

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